ramp is in operation, two are under construction, and four more are in the planning stage. There are four freeway-to-freeway HOV connectors under construction and eight in planning. HOV lanes are in operation on I-405, I-5, Route 55, and Route 57. The HOV lanes in the I-405 corridor extend 48 directional miles, which makes it one of the longest full-time HOV lanes in the county. There are also 62 directional miles of HOV lanes under construction. These facilities should be operational by mid-1996. An additional 50 miles, which is currently in design, should be operational by 2000. With the addition of the HOV lanes being planned on three toll facilities, the county should have a total of 353 directional miles of HOV lanes in operation by 2001.

The requirements placed on air quality non-attainment areas, of which the greater Los Angeles metropolitan area is the only extreme classification, limit the types of freeway projects that can be constructed. The HOV lanes are being used to help address these issues. A combination of federal and state funding is being used, along with private funding for the toll road prqjects. The toll road projects include the use of congestion pricing techniques to encourage carpooling, vanpooling, and transit use.

To date, the HOV projects in the county have been developed and implemented through the joint efforts of Caltrans, the OCTA, the Transportation Corridor Agency (TCA), FHWA, FTA, and the private sector. This joint effort has been successful at developing a long-range approach to addressing the mobility needs in the area. This has helped Orange County become a transportation leader. A short video highlighting the HOV system from the perspective of a user was shown.

HOV System Operations and Plans for the Bay Area

H. David Seriani, California Department of Transportation

Thank you, Art. It is a pleasure to have the opportunity to discuss the HOV facilities in the San Francisco Bay area this morning. For those of you who are not familiar with the Bay area, it consists of nine counties. San Francisco-which is located just south of the famous Golden Gate Bridge-Marin, Napa, and Sonoma to the north; San Mateo, Santa Clara, and Santa Cruz to the south; and Alameda and Contra Costa to the east. Caltrans District 4 covers the nine county area. Approximately 155 lane-miles of the HOV lanes are in operation in the District, with another 65 lane-miles under construction. Some 12 lane-miles of the exiting HOV lanes are being modified. In addition, about 78 lane-miles are programmed within the next five years.

All of the HOV lanes in District 4 are contiguous part-time lanes with no buffers between the HOV lane and the mixed flow lanes. The lanes revert to general purpose use-open to all vehicles-during the non-peak hours. The minimum occupancy requirements for all of the HOV facilities-except the San Francisco/Oakland Bay Bridge-is two or more persons per vehicle (2+). Toll free passage for vehicles with three or more persons (3 +) is allowed on the Golden Gate Bridge from 5:00-9:00 A.M. and from 4:00-6:00 P.M. In addition, there are about 26 lane-miles of HOV lanes in operation on expressways. These are under the control of Santa Clara County. An additional 51 lane-miles are planned on the Santa Clara County Expressway by the year 2005. In addition, there are 11 HOV bypass lanes in the District, with another 56 HOV lanes programmed for the future.

The District 4 HOV program started in 1970 on the Bay Bridge. Originally opened as a bus-only lane, carpools were soon allowed to use the lane. Three major freeways-Routes 80, 580, and 880-serve the Bay Bridge, which is a double deck bridge with the westbound lanes on the upper deck and the eastbound lanes on the lower deck. There are five lanes in each direction of travel. Annual average daily traffic for the bridge is about 250,000. In 1982, metering lights were installed just downstream of the toll plaza to help control peak-period demand.

The Bridge has four HOV lanes in the westbound direction-two on the left side and two on the right side of the toll plaza. These lanes carry about 38 to 50 percent of ail the people over the Bay Bridge in the morning peak hours. The HOV lane users bypass the metering lights and congestion at the toll plaza, saving about 15 to 20 minutes. In addition, HOVs do not have to pay the toll charge. The left hand side lanes revert back to normal toll operation in the off-peak hours, and the right hand side lanes are bus-only lanes during the off-peak hours. The Metropolitan Transportation Commission (MTC) is considering increasing the toll on this bridge.

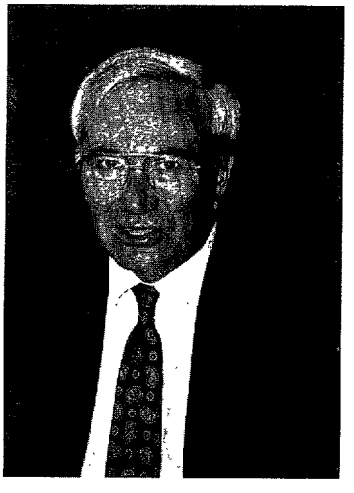
Forty-one park-and-ride lots are in operation in the Bay Area. A study is underway to examine the usage of existing lots and the need for future facilities. These facilities are served by a mix of rail and bus services.

The District 4 HOV program started in 1984 when 1/2c of the local sales tax of Measure A was approved by the voters. The HOV lane on Route 237 was also opened in 1984. The permissive shoulder HOV lane was allowed due to right-of-way constraints. Due to the left turn conflicts and to reduce confusion, the HOV lanes were located on the right hand side. Also, in addition to the regulatory signs mounted on the right shoulder, mast arms with real time changeable message signs were also installed. These signs give real time information to the motorists on the hours of operations for the permissive shoulders and the HOV lanes.

In 1986, the first few miles of the HOV lane on Route 101 was opened. Today, this facility is about 25 miles long in each direction. Utilization levels have increased dramatically with the completion of the last section of Route 101 HOV lanes. This indicates that HOV utilization will increase with the development of the HOV system. When all of the HOV lanes programmed in the District are completed, there will be more than 400 lane-miles of HOV lanes in the Bay Area.

San Diego's HOV Operations and Plans

Carl West, California Department of Transportation



I would like to discuss both the HOV planning activities currently underway in the San Diego area and describe the operating HOV facilities. HOV lanes in San Diego represent one approach being used to maintain the quality of life in the area. The HOV plan has been integrated into the growth management plan and is being monitored as part of the overall planning process.

The population of San Diego County is approximately 2.6 million. When added with Tijuana, Mexico, some five million people are expected to reside in the area within the next 20 years. The existing freeway system is approximately 300 miles. This will expand to 375 miles in the near future. About a third of the existing system experiences fairly severe levels of congestion. The geography of the area, which includes numerous canyons, results in many short trips using the freeway system. All four Interstate routes have ADTs of over 200,000. Congestion levels are expected to double, even with a planned 1.4 vehicle occupancy level during the peak hours.

A 140-mile HOV system plan is proposed for the San Diego region. In the development of the plan, both congestion levels and adequate median width were considered. Many of the older freeways in the central areas do not have enough space in the median for HOV lanes to be added. A measure of at least 1,000 vehicles per hour is used as the benchmark for consideration of an HOV lane.

The Regional Transportation Plan includes other policies addressing HOV facilities and supporting services. The policies call for special consideration for bus operations in the design of HOV facilities. The types of improvements include elements such as direct bus ramps, on-line stations, and other priority treatments. Also, any time adding to a four lane freeway or building a new freeway is being considered, HOV lanes must be examined. If HOV lanes cannot be justified at this time, sufficient right-of-way for future lanes should be acquired.

There is an extensive system of freeway entrance ramp meters in the county. HOV bypass lanes are being implemented at many of these ramps. The park-and-ride lot system is also being expanded and coordinated with the HOV facilities. Priorities have been established for different parts of the proposed HOV system.

The San Ysidro border crossing is the largest international border crossing in terms of vehicles and people in the world. Recently an HOV lane was opened at this facility. It is operated only during the week. The vehicle occupancy requirement is four or more persons (4+). There is also an HOV lane on the Coronado Toll Bridge. Carpools, which also do not pay a toll, represent 35 percent of the Bridge traffic. A bypass for buses leaving downtown San Diego is in operation in the Balboa Park area. This provides significant travel time savings for buses in the afternoon peak-period.

Located on I-l.5 is a two-lane, reversible, barrier separated HOV facility. It is eight miles in length. It is open for three hours in the morning-toward downtown San Diego-and for 3.5 hours in the afternoon in the outbound direction. It is closed during the rest of the day. There is no intermediate access, so the facility serves long